THE EFFECT OF DIETARY PROTEIN LEVELS ON GROWTH AND FEED UTILIZATION OF STRIPED MULLET (*MUGIL CEPHALUS*) AND NILE TILAPIA (*OREOCHROMIS NILOTICUS*) REARED IN A POLYCULTURE SYSTEM IN NET ENCLOSURES

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Abstract

An experiment was held to determine the optimum dietary crude protein level of striped mullet *(Mugil cephalus)* and Nile tilapia (*Oreochromis niloticus*) reared in polyculture system in net enclosures. Mullet (M) and Nile tilapia (T) fingerlings of initial body weight ± SE of 10.22 ± 0.04g and 7.90 ± 0.02g were stocked at (3M:7T) polyculture ratio in a total stocking density of 10 fish per each net enclosure respectively. Six dietary crude protein levels (12, 16, 20, 24, 28 and 32% crude protein) were evaluated in 6 x 3 complete randomized blocks design. Each treatment was replicated in three net enclosures. Results revealed that BW of striped mullet increased significantly with increasing dietary crude protein level up to 24 %. With respect to Nile tilapia, it was found that BW increased significantly with increasing dietary crude protein level up to 20 % started from week two or three of the experimental period. Final body weight (FBW) of striped mullet was found to be (21.11 ± 0.15g) when fish maintained at 24% dietary crude protein. This value was higher significantly than that obtained with fish fed diets containing 12, 16 and 20 % dietary crude protein. However, it did not defer significantly from the values observed with fish fed at 28 and 32 % dietary crude protein. Likewise, FBW of Nile tilapia followed the same trend observed with striped mullet. But 20 % dietary crude protein level and more was found to recover the requirement for maximum growth rate of Nile tilapia. Weight gain and SGR for both fish species increased significantly with increasing dietary crude protein level. FCR was significantly affected by different dietary crude protein levels. The best FCR for the whole fish (1.51 ± 0.01) was observed when fish maintained at 24 % dietary crude protein. This value did not defer significantly ($p < 0.01$) from that obtained with fish maintained at 28 and 32 % dietary crude protein. But, it was less significantly ($p < 0.01$) than those found with fish fed the less protein levels 20, 16 and 12 % dietary crude protein.

INTRODUCTION

Tilapia and mullet fish have become the most important fish species for fresh water aquaculture. The Nile tilapia (*Oreochromis niloticus*) is a popular food-fish in many tropical areas, and is hardy and fast-growing under a wide variety of management schemes (Brummett and Alon, 1994). On the other hand, striped mullet (*Mugil Cephalus*) is considered one of the important economical fish species in Egypt

and in many other countries of the world (Benetti and Fagundes Netto, 1991 and El-Dahhar *et al.*, 2000). Striped mullet have the ability to culture in both brackish and fresh water (Sarig, 1981, Pillay, 1993). Also, striped mullet have the ability to consume artificial diets (Yashouv and Ben-Shachar, 1967, Albertini - Berhaut and Vallet, 1971) beside its natural feeding habits (Albertini-Berhaut, 1974, De Silva and Wijeyaratne, 1977).

The polyculture of tilapia species only, or tilapia in combination with other teleostean species, remains one of the most promising methods of rising large, marketable-size tilapia (Dadzie, 1982). In such conditions, polyculture can even show synergistic effects, when one species improves the environmental conditions and food supply, on the other, the growth rate of each species is then higher under polyculture than in monoculture when stocked at the same density (Yashouv, 1969, Yashouv and Halevy, 1972, Reich, 1975).

The economic success of controlled production of fish depends mainly on the cost of feed and particularly on that of protein, as protein is the most expensive component in artificial diets for fish. Knowledge of the protein requirement is essential in the formulation of well-balanced and low cost artificial diets.

Previous studies investigated the protein requirements of mullets (Paparaskeva-Papoutsoglou and Alexis, 1986, El-Sayed, 1991 and Mabrouk, 1991). These studies demonstrated that dietary protein requirements of mullets varied with the salinity of water. However, many studies have been reported on the formulation of suitable artificial diets for fishes cultured in monoculture systems (Paparaskeva - Papoutsoglou and Alexis, 1986, El-Sayed and Teshima, 1992, El-Dahhar, 1994 and El-Dahhar *et al.*, 1999) to determine the dietary protein requirements for maximum growth and survival of cultured tilapia. Moreover, these studies were not mention to determine the optimal dietary protein levels for the same fish species under polyculture systems.

The present study was conducted to evaluate the effect of dietary crude protein levels on growth performance and feed utilization of striped mullet (*Mugil cephalus*) and Nile tilapia (*O. niloticus*) fingerlings reared together in polyculture system in net enclosures.

MATERIALS AND METHODS

This study was conducted at the fish farm of the Faculty of Agriculture, (Saba - Basha), Alexandria University to evaluate the effect of six dietary crude protein levels (12, 16, 20, 24, 28 and 32% crude protein) on growth performance and feed utilization of Nile tilapia (*Oreochromis niloticus*) and striped mullet (*Mugil cephalus*) in a polyculture system in eighteen net enclosures of (0.7 m^3). Net enclosures were placed in an earthen pond of ¾ feddan with an average depth of (0.8 - 1 m). The

pond was filled with fresh water from the supply cannel. Water was added only to make up for losses due to evaporation and water was filtered through sarand screen to prevent the entrance of wild fish.

Diets formulation and preparation:

Six dietary protein levels were used in this study. The composition and chemical analysis of the experimental diets are presented in Table (1). Diets were formulated from commercial ingredients of fish meal, wheat flour, wheat bran, soy bean meal, yellow corn, bone meal, vitamins and minerals. Soy bean meal to fish meal in a fixed ratio (2:1) were added at graded levels to achieve six diets containing six crude protein levels (12, 16, 20, 24, 28 and 32%). Dry ingredients were passed through a sieve (0.6 mm diameter hole) before mixing into the diets. Mixtures were homogenized in a food grader mixer attachment Model NFGA (Kitchen aid St. Gosph, MI 49085 USA). Boiling water was then blended into the mixtures using the ratio of 50% for pelleting. The diets were pelleted using meat grinder of kitchen aid with a 1.5 mm diameter and then were dried carefully and kept in plastic bags until they were used.

Experimental design:

Striped mullet and Nile tilapia fingerlings of initial body weight ± SE of 10.22 ± 0.04g and 7.90 ± 0.02g were stocked at (3:7) polyculture ratio in a total stocking density of 10 fish per each net enclosure respectively. Fish were given feed twice daily at a rate of 4% of fish biomass at 9:00h and 14:00h six days per week. The experiment was lasted for five weeks. A (6 x 3) complete randomized blocks design was used with the six crude protein levels (12, 16, 20, 24, 28 and 32%) replicated in three net enclosures

Growth performance and feed utilization measurements:

To determine fish weight, all fish of the three replicates of each treatment were taken weekly on the early morning and kept in fiberglass containers filled with fresh water from the same pond to avoid stress during recording fish weights. All fish of the triplicates were returned to their net enclosures immediately after weighing. At the end of the experimental period, several measurements, namely, mean fish weight, body weight gain (Gain), specific growth rate (SGR), percent weight gain (Gain %) and feed conversion ratio (FCR), were taken according to the following equations:

Gain = final body weight - initial body weight

SGR = 100 (In final body weight - In initial body weight) / time (days)

Gain % = 100 (weight gain / initial body weight)

FCR = food intake / weight gain

Table 1. Composition (% dry diet) and proximate analysis of the experimental diets

Contents	Diet No.					
Ingredients :	1	2	3	4	5	6
Wheat bran	29.5	25.0	22.0	18.0	15.0	11.5
Yellow corn	25.2	20.7	17.7	14.2	12.7	10.7
Wheat flour	43.0	40.0	35.5	31.0	25.0	20.0
Soy bean meal	---	8.0	15.0	23.0	30.0	37.0
Fish meal	---	4.0	7.5	11.5	15.0	18.5
Bone meal	2.0	2.0	2.0	2.0	2.0	2.0
Vit & Min. Mix *	0.3	0.3	0.3	0.3	0.3	0.3
Proximate analysis (%):						
Moisture	9.37	10.21	10.29	10.34	10.56	10.41
Crude protein	11.64	15.83	19.81	24.16	27.93	31.54
Crude fat	7.35	7.26	7.41	7.20	7.33	7.22
Crude fiber	4.38	4.20	4.18	4.12	4.14	4.13
NFE	58.09	53.07	47.50	43.10	38.92	35.48
Ash	9.17	9.43	10.81	11.08	11.12	11.22
Calculated ME** K cal / 100g	245	245	245	245	245	245
P / E ratio	47.51	64.61	80.86	98.61	114	128.73

* Vitamin and miniral mixture/kgPremix:VitaminA, 4.8 million IU, D3, 0.8 million IU , E, 4g, K, 0.8 g, riboflavin, 1.6 g, B6, 0.6 g, B12, 4 mg, Pantothinic acid, 4 g, Nicotinic acid,8 g, Folic acid, 0.4 g, Biotin, 20 mg,choline chloride, 200 g, Cu, 4g, I, 0.4 g, Iron, 12 g, Mn, 22 g, Zn, 22 g, Selenium, 0.4 g.

** Metabolizable energy k cal / 100 g diet (NRC, 1993).

RESULTS

Final body weights (FBW) of striped mullet and Nile tilapia are shown in Table (2) and Figure (1). FBW of each of mullet and tilapia fingerlings increased significantly ($P < 0.01$) with increasing dietary crude protein level, Table (2) indicate that FBW of striped mullet maintained at 24 % dietary crude protein was found to be (21.11 ± 0.15g). This value was higher significantly than that of fish given diets containing 12, 16 and 20 % crude protein. However, it did not defer significantly from that of fish maintained at 28 and 32 % dietary crude protein. Likewise, FBW of Nile tilapia followed the same trend observed with striped mullet. But the level of 20 % was found to be required for maximum weight in Nile tilapia.

Table 2. Mean ± standard error (SE) of initial and final body weight (BW),weight gain and specific growth rate (SGR) of striped mullet and Nile tilapia fingerlings fed at six dietary crude protein levels (12%, 16%, 20, 24%, 28, and 32%).

Protein Levels %	Initial (BW) M ± SE	Final (BW) M ± SE	Gain M ± SE	SGR M ± SE
Striped mullet *(Mugil cephalus)*				
12	10.22 ± 0.11^{a}	15.83 ± 0.35^{d}	5.61 ± 0.46^{c}	1.27 ± 0.08^{c}
16	10.06 ± 0.06^{a}	16.83 ± 0.25^{c}	6.78 ± 0.29^{b}	1.47 ± 0.06^{b}
20	10.22 ± 0.11^{a}	17.72 ± 0.15^{b}	7.50 ± 0.17^{b}	1.57 ± 0.04^{b}
24	10.17 ± 0.10^{a}	21.11 ± 0.15^{a}	10.49 ± 0.06^{a}	2.09 ± 0.01^{a}
28	10.39 ± 0.06^{a}	21.17 ± 0.10^{a}	10.78 ± 0.15^{a}	2.03 ± 0.03^{a}
32	10.28 ± 0.15^{a}	21.28 ± 0.15^{a}	11.00 ± 0.10^{a}	2.08 ± 0.03^{a}
Nile tilapia (*O. niloticus*)				
12	7.93 ± 0.04^{a}	14.07 ± 0.07^{b}	6.14 ± 0.08^{b}	1.64 ± 0.02^{b}
16	7.91 ± 0.05^{a}	14.00 ± 0.04^{b}	6.09 ± 0.08^{b}	1.63 ± 0.02^{b}
20	7.88 ± 0.06^{a}	16.30 ± 0.03^{a}	8.41 ± 0.08^{a}	2.08 ± 0.03^{a}
24	7.93 ± 0.04^{a}	16.29 ± 0.08^{a}	8.36 ± 0.11^{a}	2.06 ± 0.03^{a}
28	7.88 ± 0.06a	16.38 ± 0.06^{a}	8.50 ± 0.12^{a}	2.09 ± 0.03^{a}
32	7.88 ± 0.02a	16.41 ± 0.06^{a}	8.52 ± 0.05^{a}	2.09 ± 0.01^{a}

Means in the same column with the same superscript are not significantly different ($P < 0.01$).

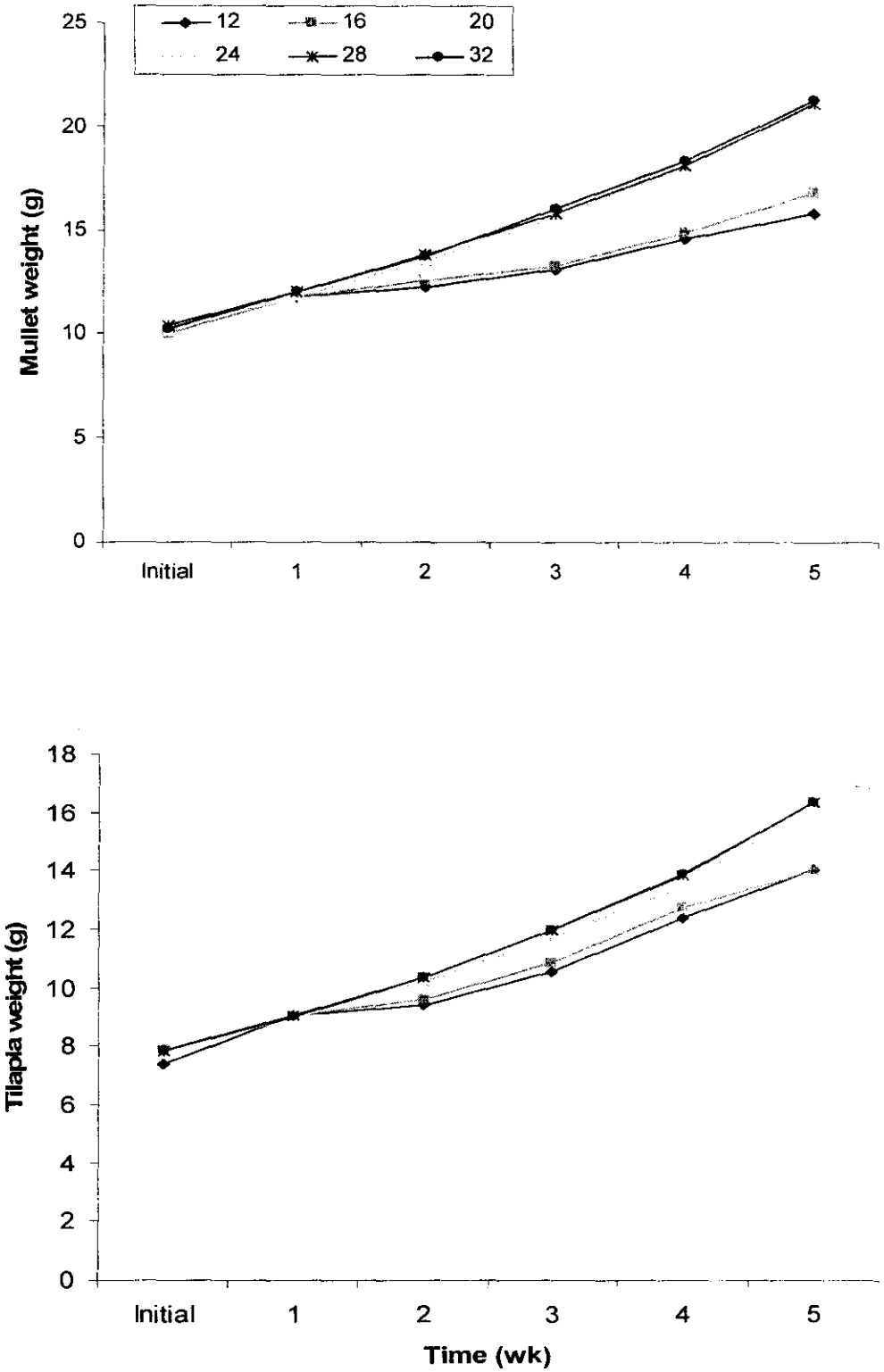

Fig .(1) :The relationship between the increase in body weight (g) and time (wk) for striped mullet and Nile tilapia fingerlings fed at six dietary crude protein levels (12, 16, 20, 24, 28 and 32%).

It is clear from the data and its statistical analysis that weight gain (WG) and specific growth rate (SGR) of Nile tilapia and striped mullet increased significantly ($P < 0.01$) with increasing dietary crude protein level from 12 up to 20 % for Nile tilapia and 24 % for striped mallet, Table (2). Increasing dietary crude protein level more than 20 % for Nile tilapia and more than 24 % for striped mullet did not reveal any significant increase in WG. WG of fish maintained at 20 % dietary crude protein for Nile tilapia and 24 % dietary crude protein for striped mullet were significantly similar to that noticed with the higher dietary crude protein levels. The least WG (5.61± 0.46 g) for striped mullet and (6.14 ± 0.08 g) for Nile tilapia were observed when fish were given diets containing 12 % crude protein. SGR followed the same trend observed with WG of striped mullet and Nile tilapia fingerlings Table (2).

Wright gain (percent of initial wt.) of striped mullet, Nile tilapia fingerlings and the total biomass are shown in Table (3). It is clear that gain % increased significantly ($p < 0.01$) with increasing dietary crude protein level for both mullet and tilapia fingerlings. The same trend was also observed for the total biomass. Gain % of the fish maintained at 32 % dietary crude protein was the best gain % observed. But statistical analysis indicated that, it was not differ significantly from gain % of fish maintained at 28 and 24% dietary crude protein for striped mullet and 28, 24 and 20% for Nile tilapia. These values were significantly better than that observed with dietary crude protein less than 24 % for striped mullet and 20 % for Nile tilapia. The least gain % (55.00±5.08 %) for striped mullet and (77.44 ± 1.26 %) for Nile tilapia were recorded with the fish maintained at 12% dietary crude protein (Table 3). Gain % of the total biomass followed the same trend observed with striped mullet and Nile tilapia (Table 3).

Table 3. Mean ± standard error (SE) of weight gain (% initial wt.) of Striped mullet and Nile Tilapia fingerlings fed at six dietary crude protein levels (12%, 16%, 20%, 24%, 28% and 32%)

Protein	Weight gain (% initial wt.)		
Levels %	Striped mullet	Nile tilapia	Total biomass
12	55.0 ± 5.08^{c}	77.44 ± 1.26^{b}	66.22 ± 2.88^{c}
16	67.41 ± 3.21^{b}	77.09 ± 1.50^{b}	71.52 ± 0.73^{c}
20	73.45 ± 2.14^{b}	106.75 ± 1.84^{a}	90.10 ± 0.81^{c}
24	104.37 ± 3.07^{a}	105.40 ± 1.82^{a}	104.00 ± 3.03^{a}
28	103.81 ± 1.96^{a}	107.86 ± 2.37^{a}	105.84 ± 0.43^{a}
32	107.09 ± 2.05^{a}	108.12 ± 0.51^{a}	107.61 ± 0.85^{a}

Means in the same column with the same superscript are not significantly different ($P<0.01$).

Average of total weight gain (TWG) for striped mullet and Nile tilapia fingerlings maintained at different dietary crude protein levels are presented in Table (4). The higher TWG observed for the whole fish was found to be (92.83 ± 0.17g) when fish maintained at 32% dietary crude protein, followed by TWG for fish groups maintained at 28 and 24% dietary crude protein respectively. No significant differences in TWG ($p < 0.01$) were found among fish groups maintained at 32, 28 and 24% dietary crude protein levels. TWG decreased gradually with decreasing dietary crude protein level from 20% to 12%. Statistical analysis revealed significant differences ($p< 0.01$) in TWG among fish maintained at 20, 16 and 12% dietary crude protein level.

Feed and nutrient utilization:

The amount of feed offered during the experiment and feed conversion ratio (FCR) are summarized in Table (4). The results showed that offered feed increased significantly ($P < 0.01$) with increasing dietary crude protein level up to 24 % protein. No significant differences were observed with increasing dietary crude protein level more than 24 % protein. Results revealed that fish maintained at 24 % dietary crude protein level consumed amount of feed higher significantly than the amount consumed by fish given diets containing 12, 16, 20 % crude protein.

FCR of the whole fish as presented in Table (4) was significantly affected by different dietary crude protein levels. The best FCR was observed when fish maintained at 24% dietary crude protein. It was found to be (1.51 ± 0.01). This value was significantly similar to that noticed with 28 and 32% dietary crude protein. FCR values increased gradually with decreasing dietary crude protein level from 24 to 12 % protein. Analysis of variance indicated that there were significant differences ($p < 0.01$) between FCR values for fish groups maintained at 20, 16 and 12% dietary crude protein.

Table 4. Mean ± standard error (SE) of total weight gain, offered feed and feed conversion ratio (FCR) of striped mullet and Nile tilapia fingerlings fed at six protein levels (12%, 16%, 20, 24%, 28, and 32%)

Protein Levels %	Total weight gain g ± SE	Offered feed g ± SE	FCR
12	59.83 ± 1.59^{d}	127.77 ± 0.40^{c}	2.14 ± 0.06^{a}
16	63.00 ± 0.29^{c}	127.37 ± 2.15^{c}	2.02 ± 0.04^{b}
20	81.33 ± 0.17^{b}	135.40 ± 0.37^{b}	1.67 ± 0.01^{c}
24	91.33 ± 0.60^{a}	137.98 ± 0.19^{a}	1.51 ± 0.01^{d}
28	92.00 ± 0.58^{a}	139.75 ± 0.34^{a}	1.52 ± 0.01^{d}
32	92.83 ± 0.17^{a}	140.25 ± 0.08^{a}	1.51 ± 0.01^{d}

Means in the same column with different superscript are significantly different ($P<0.05$).

DISCUSSION

The results of the present study revealed that final body weight of each of mullet and tilapia fingerlings reared at (3 M: 7T) polyculture ratio (PCR) increased significantly ($P < 0.01$) with increasing dietary crude protein level (Table 2 and Figure 1). The maximum growth of striped mullet was obtained when fish maintained at 24% dietary crude protein. With respect to Nile tilapia fingerlings, the level of 20 % protein was found to be the level required for maximum weight gain. These results confirmed the findings of El-Sayed and Teshima, 1992, El-Dahhar, 1994 and El-Dahhar et al., 1999 and 2000 to determine the dietary protein requirements for maximum growth and survival of Nile tilapia. The present study indicates that the level of 20% dietary crude protein is considered enough to obtain the maximum growth for Nile tilapia fingerlings under polyculture system in net enclosures.

The level of 24% dietary crude protein which considered being the best level for striped mullet fingerlings is similar to that reported in certain preliminary experiments for Mugil capito of weight 0.8 and 3 g (Vallet et al., 1970). Paparaskeva et al., (1986) studied the protein requirements of young grey mullet *Mugil capito* by using five semi-purified diets containing 12 to 60% protein, in increments of 12 %, and fed for 97 days to young *Mugil capito* of average initial weight 2.5g. The food conversion factor decreased with increasing dietary protein level, although the differences were not significant as dietary crude protein increased above the level of 24%. Previous study indicated that *Liza ramada* reared in fresh water required about 35-40 % dietary crude protein for optimum growth (El-Sayed, 1991). Similar result obtained in the experiment carried out by Mabrouk, (1991) on striped mullet fingerlings. He found that *Mugil cephalus* fingerlings reared in fresh water required 40% dietary crude protein level for optimum growth and best performance. The present study indicated that 24% dietary crude protein was the best level for striped mullet fingerlings.

This wide range of protein required for best growth seems likely, that striped mullet utilizes protein for body growth more efficiently than *Liza ramada*. Moreover the decrease in dietary crude protein level for striped mullet in the present study could be reflect the positive effect occurred when striped mullet reared in a poly culture system with Nile tilapia fingerlings. The results agree with the base which say, the growth rate of fish species is higher under polyculture than when stocked at the same density in monoculture (Yashouv, 1969, Yashouv and Halevy, 1972, Reich, 1975). This decrease in dietary crude protein levels for striped mullet fingerlings may be due to the age of the experimental fish. Benedicht and Satia, (1974) stated that, the shift in protein requirements with age demonstrates that the older fish should have a lower protein requirements for maximum growth than young fish do.

The results showed in Table (2) demonstrated body weight gain and specific growth rate (SGR) and suggested that 24% and 20% dietary crude protein level is the optimum level for both striped mullet and Nile tilapia fingerlings respectively. The same trend was observed with weight gain (% of the initial wt.) for striped mullet and the total fish biomass, while the gain % for Nile tilapia fingerlings was found to be higher with the diet containing 20% protein. No significant differences in gain % within Nile tilapia fingerlings maintained at 20% dietary crude protein and any level of protein above this level (Table 3). These results demonstrated that striped mullet required dietary crude protein level higher than tilapia requirements which was found at previous studies, (Paparaskeva, *et. al.*, 1986, Siddiqui *et. al.*, 1988 and El-Dahhar, 1994).

The present study indicates that total weight gain and feed conversion ratio (FCR) were better with the diet containing 24% crude protein than 12, 16 and 20% dietary crude protein. These results agree with what Shiau and Peng (1993) found with Juvenile hybrid (*O. niloticus* X *O. aureus*). He found that decreasing the dietary protein level from 28 to 24% by increasing starch or dextrin content in the diet did not reduce weight gain. Fayed (1997) found that differences between young Nile tilapia 31g initial BW fed on diets graded in crude protein level from 14% to 38% , isocaloric diets, were not significant in growth performance and feed utilization.

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تأثير مستويات بروتين الغذاء على نمو أسماك البورى والبلطى النيلى وعلى الإستفادة من الغذاء فى نظام الإستزراع المتعدد فى تحاويط شبكية

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١ . *قسم الإنتاج الحيواني والسمكي – كلية الزراعة (سابا باشا) – جامعة الإسكندرية*

٢ . *المعمل المركزي لبحوث الاستزراع المائي – وزارة الزراعة*

أجريت تجربة بهدف تقدير مستوى البروتين الخام الأمثل لكل من أسماك البورى والبلطى النيلى المستزرعة بنظام الاستزراع المتعدد فى تحاويط شبكية . تم تخزين إصبعيات البورى والبلطى ذات وزن ابتدائى ١٠,٢٢ ± ٠,٠٤ جم و ٧,٩٠ ± ٠,٠٢ جم على التوالى باستخدام معدل تخزين ٣ بورى : ٧ بلطى بكثافة ١٠ سمكة/ تحويطة شبكية ذات حجم قدره ٠,٧م^{٣}. وقد تم تغذية الأسماك على علائق تحتوى على (١٢ ، ١٦ ، ٢٠، ٢٤ ، ٢٨ ، ٣٢ % بروتين خام) وتم تقييمها باستخدام ٦ × ٣ قطاعات عشوائية تامة . كل معاملة تم تكرارها فى ثلاث تحاويط شبكية. وقد وجد أن زيادة مستوى البروتين فى الغذاء إلى ٢٠ % بالنسبة لأسماك البلطي النيلي و٢٤ % بالنسبة للبوري أدي إلى زيادة معنوية فى أوزان الأسماك فى نهاية التجربة. فقد كان الوزن النهائي للأسماك هو ٢١,١١ ± ٠,١٥ جم لأسماك البورى عندما تم تغذيتها على ٢٤ % بروتين خام و ١٦,٣٠ ± ٠,٠٣ لأسماك البلطي عندما تم تغذيتها علي ٢٠% بروتين خام. هذه القيم هي أعلى معنوياً من نظيراتها للأسماك التي غذيت علي علائق تحتوي بروتين خام أقل من ذلك. ولم تحقق زيادة نسبة البروتين الخام في الغذاء أعلي من ٢٤% بالنسبة لأسماك البوري و٢٠% بالنسبة لأسماك البلطي أي زيادة معنوية في وزن الجسم لكلا الجنسين. ولقد تأثر معدل الاستفادة من الغذاء معنوياً بزيادة نسبة البروتين فى الغذاء، وكان أفضل معدل تحويل للغذاء للأسماك ككل (١,٥١ ± ٠,٠١) عند تغذية الأسماك على ٢٤ % بروتين خام . ولم تختلف تلك القيمة معنوياً عن تلك الملاحظة عند ٢٨ ، ٣٢ % بروتين خام. كما يشير التحليل الإحصائى إلى وجود فروق معنوية فى قيم معدل تحويل الغذاء بين مجموعات الأسماك المغذاة على ٢٠ ، ١٦ ، ١٢ % بروتين خام. تشير خلاصة النتائج إلى أن أفضل نسبة بروتين لكل من أسماك البورى والبلطى النيلى المرباه تحت ظروف الاستزراع المتعدد في تحاويط شبكية هى ٢٤ % لتحقيق أعلى زيادة فى الوزن وأفضل معدل تحويل للغذاء.